

Claims:

1. A method for performing user controllable autotuning of a PID controller, the method comprising:

5 receiving user input indicating a desired characteristic of a PID controller autotuning algorithm;

configuring the PID controller autotuning algorithm in response to the user input indicating the desired characteristic, wherein said configuring produces a configured PID controller autotuning algorithm;

10 executing the configured PID controller autotuning algorithm to tune the PID controller.

2. The method of claim 1,
wherein the PID controller autotuning algorithm executes according to the desired
15 characteristic specified by the user.

3. The method of claim 1,
wherein the user input indicating the desired characteristic indicates a desired
operation of the PID controller after execution of the autotuning algorithm.

20 4. The method of claim 3,
wherein the desired operation includes one or more of stiffness and response time.

5. The method of claim 1, further comprising:
25 displaying a graphical user interface on a display device, wherein the graphical user interface includes one or more user input controls which are operable to receive the user input indicating the desired characteristic of the PID controller autotuning algorithm;
wherein said receiving user input comprises the one or more user input controls receiving the user input.

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6. The method of claim 5,
wherein the one or more user input controls comprise one or more slider controls.

7. The method of claim 5,
wherein the one or more user input controls comprise one or more data fields;
wherein the one or more data fields are operable to receive respective parameter values
indicating the desired characteristic of the PID controller autotuning algorithm.

8. The method of claim 1,
wherein the user input comprises one or more parameter values indicating the
desired characteristic of the PID controller autotuning algorithm; and
wherein said configuring the PID controller autotuning algorithm comprises
applying the one or more parameter values to parameters of the PID controller autotuning
algorithm.

9. The method of claim 1, further comprising:
displaying a command line interface on a display device, wherein the command
line interface is operable to receive the user input indicating the desired characteristic of
the PID controller autotuning algorithm;
wherein said receiving user input comprises the command line interface receiving
the user input.

10. The method of claim 1,
wherein the user input determines a value d, wherein the value d indicates the
desired characteristic of the PID controller autotuning algorithm; and
wherein said configuring the PID controller autotuning algorithm comprises
applying the value d to modified Ziegler-Nichols equations:

$$P = 0.7 * K_{max};$$

$$I = P / (0.5 * T) \text{ where } T \text{ is the time corresponding to } f_o;$$

$$D = (1 * d + 5) * P * 0.125 * T \text{ where } d \text{ specifies the control characteristic; and}$$

$T_d = 5 * d + 1$ where T_d is a derivative sample period.

11. The method of claim 1,

wherein the user input comprises a user-drawn step response curve, wherein the
5 step response curve is displayed on a graphical user interface on a display device, and
wherein the method further comprises:

deriving one or more parameter values indicating the desired characteristic of the
PID controller autotuning algorithm from the user-drawn response curve;

wherein said configuring the PID controller autotuning algorithm comprises
10 applying the one or more parameter values to parameters of the PID controller autotuning
algorithm.

12. A computer system for performing user controllable autotuning of a PID
controller, the computer system comprising:

15 a processor;

a memory medium coupled to the processor, wherein the memory medium stores:

a PID controller autotuning algorithm; and

a software program operable to configure the PID controller autotuning
algorithm in response to user input;

20 an input device which is operable to receive user input indicating a desired
characteristic of the PID controller autotuning algorithm;

wherein the software program is operable to configure the PID controller
autotuning algorithm in response to the user input indicating the desired characteristic,
wherein said configuring produces a configured PID controller autotuning algorithm;

25 wherein the processor is operable to execute the configured PID controller
autotuning algorithm to tune the PID controller.

13. The computer system of claim 12, further comprising:

a display device coupled to the processor, wherein the display device is operable to display a user interface which is operable to receive the user input indicating a desired characteristic of a PID controller autotuning algorithm.

5 14. The computer system of claim 13,

wherein the user interface comprises a graphical user interface, wherein the graphical user interface includes one or more user input controls which are operable to receive the user input indicating the desired characteristic of the PID controller autotuning algorithm; and

10 wherein said receiving user input comprises the one or more user input controls receiving the user input.

15 15. The computer system of claim 14,

wherein the one or more user input controls comprise one or more slider controls.

16. The computer system of claim 13,

wherein the user interface comprises a command line interface, wherein the command line interface is operable to receive the user input indicating the desired characteristic of the PID controller autotuning algorithm.

20 17. The computer system of claim 12,

wherein the PID controller autotuning algorithm is executable according to the desired characteristic specified by the user; and

25 wherein the user input indicating the desired characteristic indicates a desired operation of the PID controller after execution of the autotuning algorithm.

18. The method of claim 17,

wherein the desired operation includes one or more of stiffness and response time.

wherein the user input comprises one or more parameter values indicating the desired characteristic of the PID controller autotuning algorithm; and

wherein said configuring the PID controller autotuning algorithm comprises applying the one or more parameter values to parameters of the PID controller autotuning
5 algorithm.

25. A graphical user interface displayed on a display device, wherein the graphical user interface includes:

one or more user input controls displayed in the graphical user interface which
10 are operable to receive user input indicating a desired characteristic of a PID controller autotuning algorithm;

wherein the user input indicating the desired characteristic of the PID controller autotuning algorithm is operable to be used in configuring the PID controller autotuning algorithm.

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